

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A sharpening unit for a blade, comprising a grinding wheel unit with at least two grinding wheels opposed arranged to act on two opposed sides defining a cutting bevel of said blade, wherein said grinding wheel unit being supported by a supporting structure adapted and arranged so that said grinding wheel unit operatively moves is freely movable on said supporting structure by according to at least a first degree of freedom to center the grinding wheels in respect to a lying surface of a portion of the cutting bevel of the blade on which said grinding wheels act.

2. (Previously Presented) Sharpening unit as claimed in claim 1, further comprising a system to move the grinding wheel unit towards the blade along a direction of forward movement.

3. (Currently Amended) Sharpening unit as claimed in claim 1, or 2, 29 or 30, wherein said grinding wheel unit is provided with supporting structure is further adapted and arranged so that said grinding wheel unit includes a partly restricted movement according to a second degree of freedom

to center said grinding wheels in respect to said lying surface.

4. (Currently Amended) ~~Sharpening unit as claimed in claim 3, A sharpening unit for a blade, comprising a grinding wheel unit with at least two grinding wheels opposed to act on two sides defining a cutting bevel of said blade, wherein said grinding wheel unit is freely movable according to at least a first degree of freedom to center the grinding wheels in respect to a lying surface of a portion of the cutting bevel of the blade on which said grinding wheels act, wherein said grinding wheel unit is provided with a partly restricted movement according to a second degree of freedom to center said grinding wheels in respect to said lying surface, and wherein said grinding wheel unit can oscillate about an axis of oscillation disposed in an intermediate position between axes of rotation of the grinding wheels, and wherein movability about said axis of oscillation constitutes said second degree of freedom.~~

5. (Previously Presented) Sharpening unit as claimed in claim 4, wherein said axis of oscillation lies essentially on a lying plane of the portion of the cutting bevel of the blade on which said grinding wheels act, or on

a plane that approximates a lying surface of said portion of the cutting bevel of the blade.

6. (Currently Amended) ~~Sharpening unit as claimed in claim 2, A sharpening unit for a blade, comprising a grinding wheel unit with at least two grinding wheels opposed to act on two sides defining a cutting bevel of said blade, and a system to move the grinding wheel unit towards the blade along a direction of forward movement, wherein said grinding wheel unit is freely movable according to at least a first degree of freedom to center the grinding wheels in respect to a lying surface of a portion of the cutting bevel of the blade on which said grinding wheels act, and wherein said direction of forward movement of the grinding wheel unit is parallel to an axis of oscillation of the grinding wheel unit.~~

7. (Previously Presented) Sharpening unit as claimed in claim 4, wherein said grinding wheels are disposed essentially symmetrically to said axis of oscillation.

8. (Currently Amended) ~~Sharpening unit as claimed in claim 1, A sharpening unit for a blade, comprising a grinding wheel unit with at least two grinding wheels opposed to act on two sides defining a cutting bevel of said blade, wherein said grinding wheel unit is freely movable~~

according to at least a first degree of freedom to center
the grinding wheels in respect to a lying surface of a
portion of the cutting bevel of the blade on which said
grinding wheels act, and wherein said grinding wheel unit is
freely movable along a direction of translation not parallel
to the lying surface of the portion of said cutting bevel on
which said grinding wheels act, wherein movement along said
direction of translation constitutes said first degree of
freedom.

9. (Previously Presented) Sharpening unit as claimed
in claim 8, wherein said direction of translation is
approximately orthogonal to said lying surface.

10. (Previously Presented) Sharpening unit as claimed
in claim 4, wherein said axis of oscillation is orthogonal
to a direction of translation of the grinding wheel unit.

11. (Previously Presented) Sharpening unit as claimed
in claim 4, wherein said grinding wheel unit has a center of
gravity which lies on said axis of oscillation.

12. (Previously Presented) Sharpening unit as claimed
in claim 8, wherein a counterweight moving along said
direction of translation is associated with said grinding
wheel unit, linking means being provided to force the

counterweight to move in a direction opposite to said grinding wheel unit along said direction of translation.

13. (Previously Presented) Sharpening unit as claimed in claim 4, wherein said grinding wheel unit is stressed in a predetermined angular position in respect to said axis of oscillation.

14. (Previously Presented) Sharpening unit as claimed in claim 4, further comprising means to bring said grinding wheels alternately into an operating position and into a non-operating position.

15. (Previously Presented) Sharpening unit as claimed in claim 14, wherein said means comprise an actuator that produces a movement of oscillation of the grinding wheel unit around said axis of oscillation to move the grinding wheels against the blade in said operating position and hold the grinding wheels in contact with the blade, and wherein said grinding wheel unit is free to translate along a direction of translation to become centered in respect to the blade.

16. (Previously Presented) Sharpening unit as claimed in claim 15, wherein a control element operated by said actuator is associated with said grinding wheel unit, to act on the grinding wheel unit to move the grinding wheels

against the blade and bring the grinding wheels into said operating position, said control element being irreversible, with stress exerted by the blade on the grinding wheels not producing an opposite movement to movement bringing the grinding wheel against the blade.

17. (Previously Presented) Sharpening unit as claimed in claim 16, wherein said control element comprises a slider rotating around an axis of the slider controlled by said actuator, and a mechanism that produces axial sliding of said slider in a support when said slider is made to rotate around said axis by said actuator, said axial sliding of the slider producing rotation of the grinding wheel unit in a direction to move the grinding wheels against the blade.

18. (Previously Presented) Sharpening unit as claimed in claim 4, wherein said grinding wheel unit further comprises a plate rotatingly supported around said axis of oscillation by a slide sliding along a sliding guide parallel to a direction of translation.

19. (Previously Presented) Sharpening unit as claimed in claim 18, wherein said sliding guide is carried by a carriage moving along said direction of forward movement of the grinding wheel unit.

20. (Previously Presented) Sharpening unit as claimed in claim 4, further comprising an angular position sensor of the grinding wheel unit in respect to said angle of oscillation.

21. (Currently Amended) A cutting machine for cutting elongated products comprising at least one path for the products to be cut; at least one device to feed the products along said at least one path; at least one blade provided with a cutting movement to cut said products; and at least one sharpening unit ~~for said at least one blade, which~~ comprises a grinding wheel unit with at least two grinding wheels opposed according to claim 1 adapted and arranged to act on said at least one blade, ~~wherein said sharpening unit is made according to claim 1.~~

22. (Previously Presented) Cutting machine as claimed in claim 21, wherein said grinding wheel unit is oscillating around an axis of oscillation essentially orthogonal to a direction of feed of the products to be cut along said at least one path.

23. (Previously Presented) Cutting machine as claimed in claim 21 or 22, wherein said grinding wheel unit is free to translate along a direction of translation essentially parallel to the direction of feed of the products to be cut.

24. (Previously Presented) Cutting machine as claimed in claim 21, wherein said at least one blade is a disk-shaped blade rotating around a respective axis, carried by a unit rotating around its axis of rotation.

25. (Currently Amended) Cutting machine as claimed in claim 24, wherein said disk-shaped blade is provided with an alternate movement essentially parallel to a direction of feed of the products to be cut and further comprising a counterweight associated with said grinding wheel unit moving along a direction of translation, and connection means to force the counterweight to move in ~~the~~ a direction opposite to said grinding wheel unit along said direction of translation.

26. (Previously Presented) Cutting machine as claimed in claim 21, wherein two sharpening units are associated with said at least one blade.

27. (Previously Presented) Cutting machine as claimed in claim 26, wherein a first one of said two sharpening units has idle grinding wheels and a second one of said two sharpening units has motorized grinding wheels, said idle grinding wheels and the motorized grinding wheels having different inclinations in respect to said blade.

28. (New) A sharpening unit for a blade, comprising a grinding wheel unit with at least two grinding wheels opposed to act on two sides defining a cutting bevel of said blade, and a system to move the grinding wheel unit towards the blade along a direction of forward movement, wherein said grinding wheel unit is freely movable according to at least a first degree of freedom to center the grinding wheels in respect to a lying surface of a portion of the cutting bevel of the blade on which said grinding wheels act, wherein said grinding wheel unit is provided with a partly restricted movement according to a second degree of freedom to center said grinding wheels in respect to said lying surface, and wherein said grinding wheel unit can oscillate about an axis of oscillation disposed in an intermediate position between axes of rotation of the grinding wheels, and wherein movability about said axis of oscillation constitutes said second degree of freedom.

29. (New) Sharpening unit as claimed in claim 1, wherein said supporting structure includes a slide freely movable along a guide, said grinding wheels being supported by said slide.

30. (New) Sharpening unit as claimed in claim 29, further comprising a system to move the grinding wheel unit towards the blade along a direction of forward movement.

31. (New) Sharpening unit as claimed in claim 29, wherein said slide of said grinding wheel unit is oscillatingly supported about an axis of oscillation supported by said slide.

32. (New) Sharpening unit as claimed in claim 31, wherein said grinding wheels are disposed essentially symmetrically to said axis of oscillation.

33. (New) Sharpening unit as claimed in claim 31, wherein said grinding wheel unit is stressed in a predetermined angular position in respect to said axis of oscillation.

34. (New) A sharpening unit for a blade, comprising a supporting structure;

a grinding wheel unit with at least two grinding wheels arranged to act on two opposed sides defining a cutting bevel of said blade;

a connection between said supporting structure and said grinding wheel unit structured for self-centering said at least two grinding wheels with respect to said blade, wherein said connection is arranged to leave said grinding wheel unit to freely move according to at least a first degree of freedom with respect to said supporting structure.

35. (New) A sharpening unit for a blade, comprising
a supporting structure;
a grinding wheel unit with at least two grinding wheels
arranged to act on two opposed sides defining a cutting
bevel of said blade;
a connection between said supporting structure and said
grinding wheel unit, said connection being arranged to leave
said grinding wheel unit to freely slide along a sliding
direction with respect to said supporting structure.

36. (New) A sharpening unit as claimed in claim 35,
wherein said connection includes a slide slidably movable
on a guide connected to said supporting structure.

37. (New) A sharpening unit as claimed in claim 36,
wherein said grinding wheels are oscillating around an axis
of oscillation idly mounted on said slide.

38. (New) A cutting machine for cutting elongated
products comprising a path for the products to be cut; a
device to feed the products along said path; a blade
provided with a cutting bevel to cut said products; a
sharpening unit for said blade, said sharpening unit
including
a supporting structure;

a grinding wheel unit with at least two grinding wheels arranged to act on two opposed sides defining a cutting bevel of said blade;

a connection between said supporting structure and said grinding wheel unit, wherein said connection is arranged to leave said grinding wheel unit to freely move according to at least a first degree of freedom with respect to said supporting structure; said connection being structured to cause said grinding wheels to be centered in respect to a lying surface of a portion of said bevel.

39. (New) A cutting machine for cutting elongated products comprising a path for the products to be cut; a device to feed the products along said path; a blade provided with a cutting bevel to cut said products; a sharpening unit for said blade, said sharpening unit including

a supporting structure;

a grinding wheel unit with at least two grinding wheels arranged to act on two opposed sides of said cutting bevel;

a connection between said supporting structure and said grinding wheel unit, wherein said connection is arranged to leave said grinding wheel unit to freely slide along a sliding direction with respect to said supporting structure.

40. (New) The cutting machine as claimed in claim 39, wherein said connection includes a slide slidingly movable on a guide connected to said supporting structure.

41. (New) The cutting machine as claimed in claim 40, wherein said grinding wheels are oscillating around an axis of oscillation idly mounted on said slide.

42. (New) The cutting machine as claimed in claim 41, including a constraint member limiting the oscillation of said grinding wheels around said axis of oscillation.